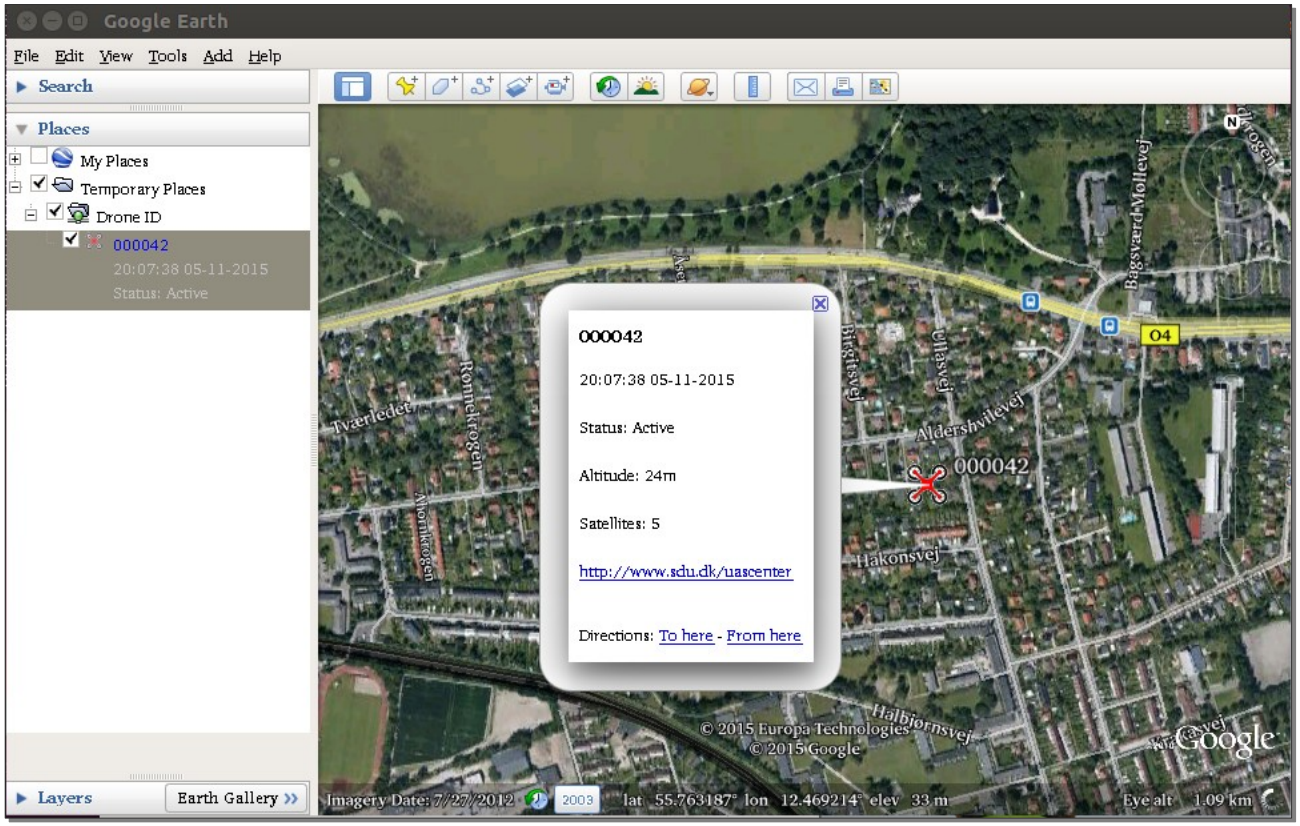
Drone ID

Drone identification and activity monitoring.



Project status November 11, 2015

Kjeld Jensen
Cand.Scient. PhD
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Drone ID architecture

On-site monitoring

Beacon

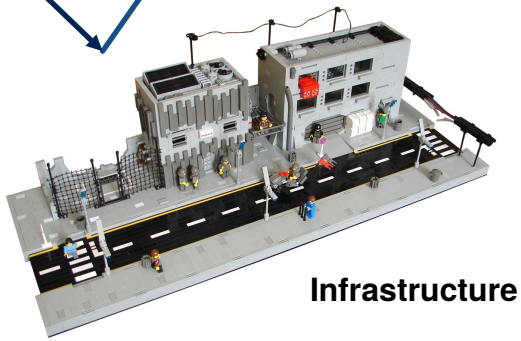
UAS Traffic Management (UTM)

Access

Drone flight pre-registration

Handheld

Vehicle



Infrastructure

Drone ID architecture

Network

GPRS modem

Access

UAS Traffic Management (UTM)

Cell tower

Drone flight pre-registration

Drone ID record

Flight

- Activity ID — unique
- Status — planned/ongoing/completed/cancelled
- Start — date and time
- End — date and time
- Geofence — polygon describing boundary of operation
- Type — commercial/recreational
- Purpose — specified e.g. training/inspection/transport etc.

Drone

- Drone ID — issued by authority
- Type — autofill if ID is available
- Payload — e.g. camera/sensor

Pilot

- Name
- Address
- Phone
- Email
- Company

Authorization

- Status — not required/pending/approved/denied
- Authorities — autofill based on location and drone ID

UAS Traffic Management (UTM)

Activity records will automatically be validated (based on drone ID and geofencing) against static and dynamic restricted zones and submitted for approval by relevant authority.

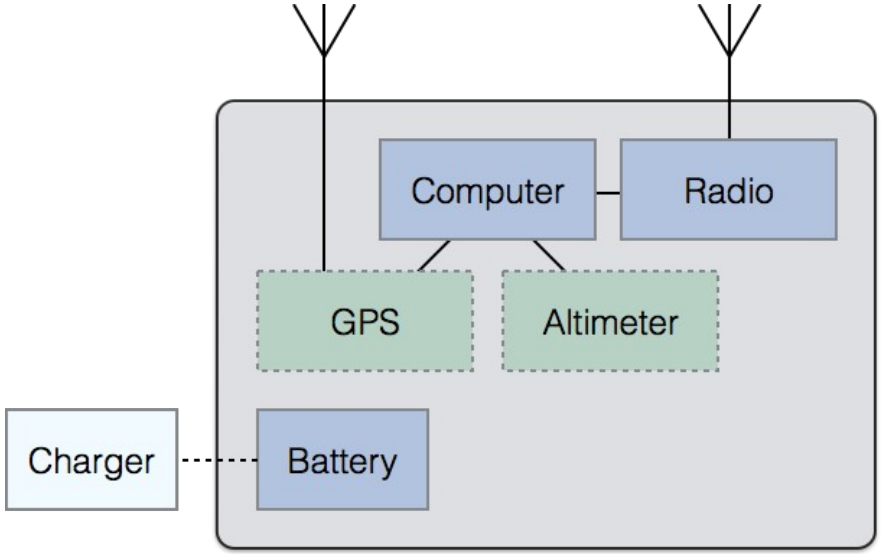
Drone ID prototype

Beacon data

- Unique ID issued by authority
- Optional data (based on sensors):
  - Position, elevation
  - Velocity, heading
  - Flight time
- Rolling key encryption to prevent unauthorized access and spoofing

Hardware

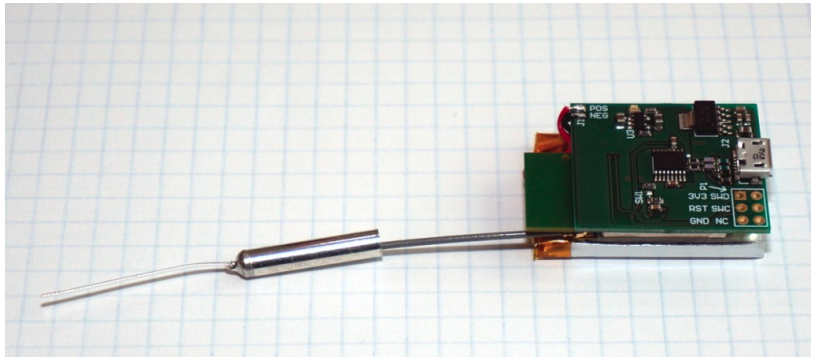
- Self contained, no interface to drone
- Very small form factor
- Light weight
- Low power operation
- Beacon interval 1 second
- Optional GPS and altimeter



Hardware modules

Drone ID beacon

On site monitoring

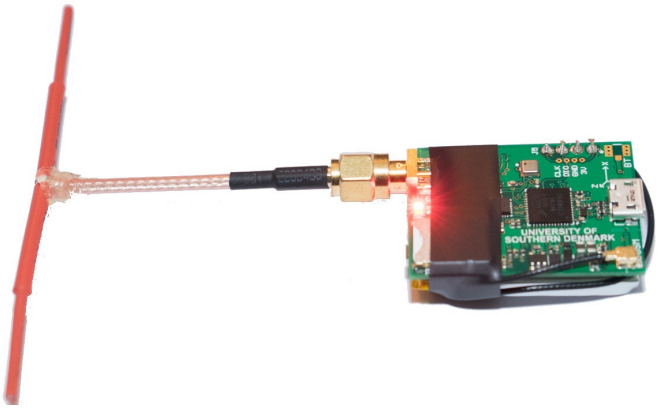


Prototype specs.

- Wifi radio
- External 2.4 GHz antenna
- Weight approx. 10 g
- No connections to the drone
- Micro USB charging

- Expected working range 500 - 1000m
- May require receiver hardware, antenna etc.
- No ground based infrastructure.
+ Lower size, weight, power.
+ Lower price

Network

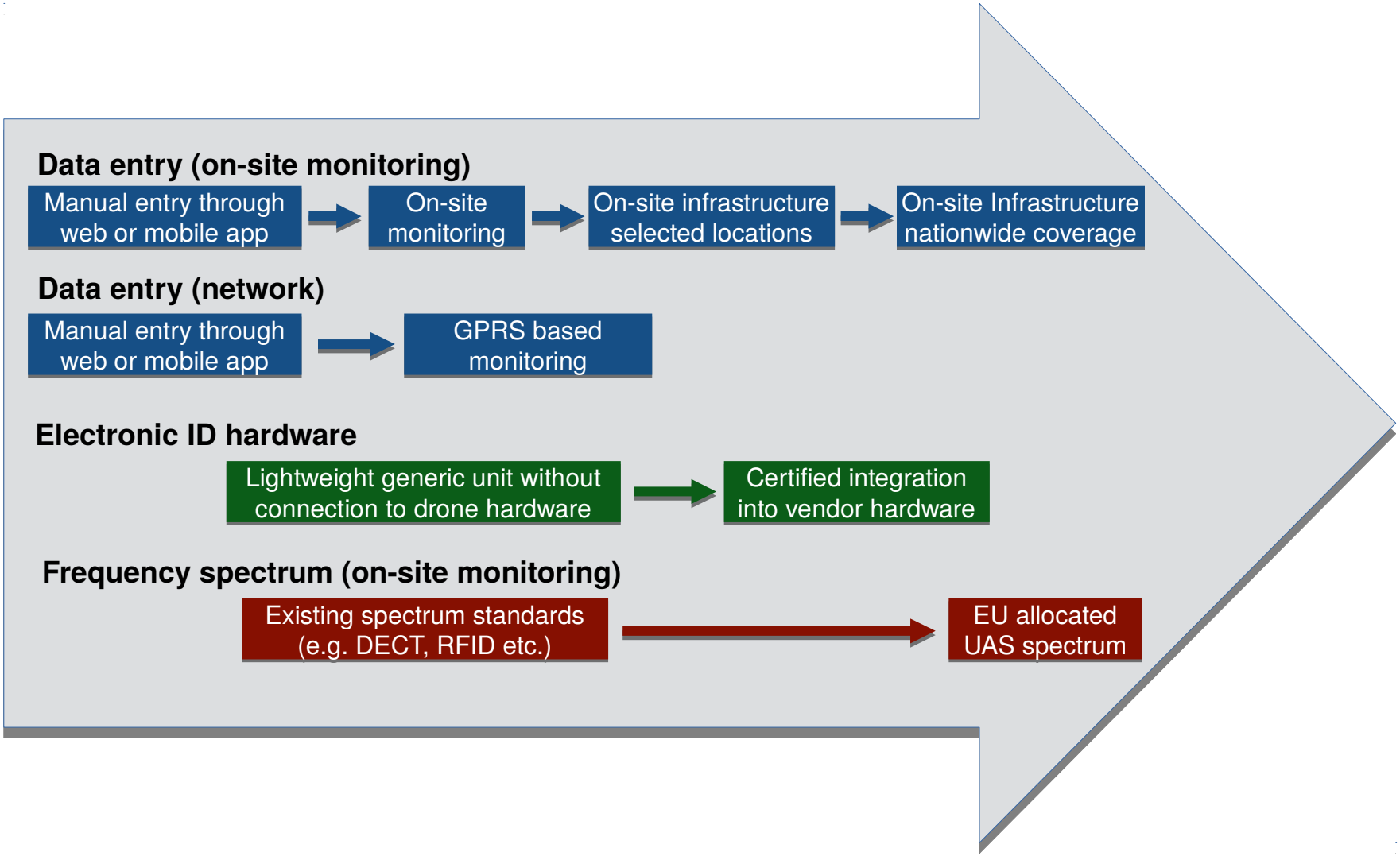


Prototype specs.

- GPRS modem
- GPS
- External GPS antenna
- Weight approx. 20 g
- No connections to the drone
- Micro USB charging

- Coverage limited by network (potential MVNO roaming).
+ No receiver hardware needed.
+ Infrastructure already established
- Higher size, weight, power.
- Higher price.
- Requires SIM card and subscription.

Implementation road map



Current research

- 10 drone operators use a GPRS/GPS based beacon for one month starting mid November 2015.
- Workshops with drone operators, industrial partners, the police and other stakeholders focusing on user experience and feedback, on-site monitoring demonstrations, etc.
- Documentation completed ultimo 2015.
- Hardware and software developed by SDU within the project released as open source.

Partners

- Danish Transport and Construction Agency
- University of Southern Denmark
- *UAS Denmark*

Companies contributing to the project

- DroneSoft ApS (mobile App showcase)
- Resiewe A/S (on-site beacon showcase)
- Scandinavian Avionics A/S (on-site beacon showcase)

Thank you for listening!

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